# [illegible]

$$H_2O \rightleftharpoons H^+ + OH^-$$

[illegible] ______ [illegible]

[illegible] ______ [illegible]

[illegible] ______ [illegible] ?

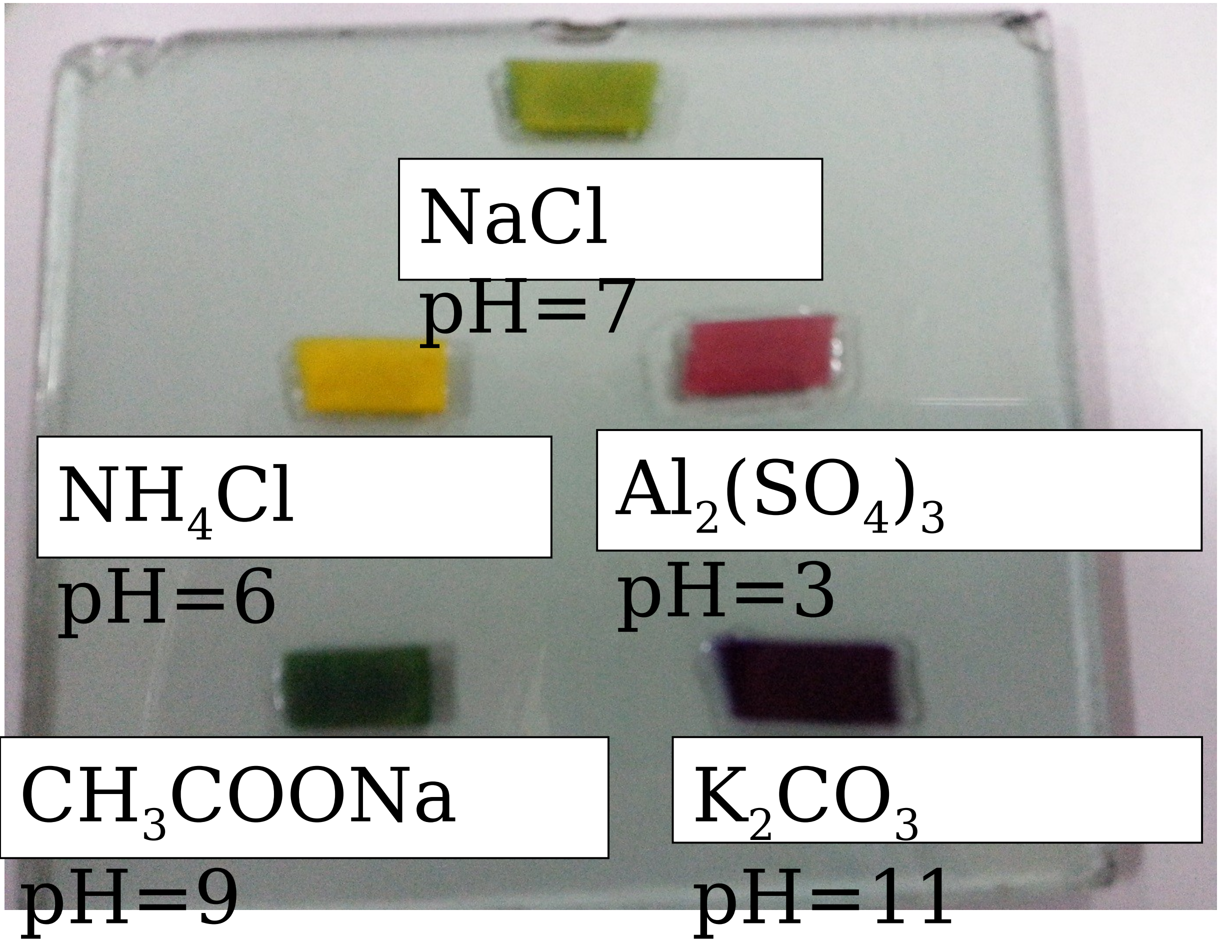
[illegible]

## [illegible]

1. [illegible] **pH** [illegible] **pH** [illegible]

2. [illegible]

**aCl**[illegible] **$NH_4Cl$**[illegible] **$Al_2(SO_4)_3$**[illegible] **$CH_3COONa$**[illegible] **$K_2CO_3$**




[illegible]

[illegible] — [illegible]

[illegible] — [illegible]

[illegible] — [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

① $K_2SO_3$ [illegible]

②$AgNO_3$ [illegible]

③$Na_2S$ [illegible]

④$FeBr_3$ [illegible]

⑤$CuSO_4$ [illegible]

⑥$NaClO$ [illegible]

⑦ $KI$ [illegible]

[illegible]

[illegible]——
[illegible]

1. [illegible]——[illegible]——[illegible] $NH_4Cl$ [illegible]

2. [illegible]——[illegible]——[illegible] $CH_3COONa$ [illegible]

3. [illegible]——[illegible]——[illegible] $NaCl$ [illegible]

# □□ $CH_3COONa$ □□□□□□□□□□□

$H_2O \rightleftharpoons H^+ + OH^-$

+

$CH_3COONa = CH_3COO^- + Na^+$

$\rightleftharpoons$

$CH_3COOH$

$c(OH^-)$ □ $c(H^+)$

$CH_3COONa + H_2O \rightleftharpoons CH_3COOH + NaOH$

$CH_3COO^- + H_2O \rightleftharpoons CH_3COOH + OH^-$

[illegible] $H^+$ [illegible] $OH^-$ [illegible]

[illegible] $c(H^+)$ [illegible] $c(OH^-)$ [illegible]

—— [illegible]

[illegible] [illegible]

1. [illegible] $H^+$ [illegible] $OH^-$ [illegible]

[illegible]

[illegible] $H^+$ [illegible] $OH^-$ [illegible]

2. [illegible] [illegible] → [illegible]

[illegible] $+ H_2O \rightleftharpoons$ [illegible] $+ OH^-$

[illegible] $+ H_2O \rightleftharpoons$ [illegible] $+ H^+$

[illegible]

[illegible]

## 3. [illegible]

[illegible] [illegible] + [illegible] $\underset{[illegible]}{\overset{[illegible]}{\rightleftharpoons}}$ [illegible] + [illegible]

[illegible]

[illegible] $P_{58}$ [illegible]

[illegible]

[illegible] 0.01mol/L [illegible] $CH_3COONa$ [illegible]

Kh [illegible] $Ka(CH_3COOH) = 1.75\times10^{-5}$ mol/L [illegible]

$$Kh=Kw/Ka=10^{-14}/(1.75\times10^{-5})=5.71\times10^{-10}$$

[illegible]

[illegible]

## 4 [illegible]

NaF　　[illegible] 2 [illegible] $Na_2CO_3$　　[illegible] 3 [illegible] $CuSO_4$ [illegible] $FeCl_3$

NaHS　　[illegible] 5 [illegible] $CH_3COONH_4$

① [illegible]“[illegible]”[illegible]

② [illegible] So [illegible]“ ⇌ ”，

[illegible]“ == ”[illegible]“↑”[illegible]“↓”[illegible]

[illegible] $NH_3 \cdot H_2O$ [illegible] $H_2CO_3$ [illegible]

[illegible]

③ [illegible]

④ [illegible]

## [illegible]

① [illegible]——[illegible]

[illegible] $CH_3COONH_4$ [illegible] $(NH_4)_2CO_3$ [illegible] $NH_4HCO_3$

$$CH_3COO^- + NH_4^+ + H_2O \rightleftharpoons CH_3COOH + NH_3\cdot H_2O$$

② [illegible]“[illegible]”[illegible]“ == ”[illegible]“↑”[illegible]“↓”[illegible]

$$Al^{3+} + 3HCO_3^- = Al(OH)_3\downarrow + 3CO_2\uparrow$$

[illegible]“[illegible]”[illegible]

$Al^{3+}$ [illegible] $AlO_2^-$ [illegible] $HCO_3^-$ [illegible] $CO_3^{2-}$ [illegible] $S^{2-}$ [illegible] $HS^-$ [illegible] Cl

$Fe^{3+}$ [illegible] $AlO_2^-$ [illegible] $HCO_3^-$ [illegible] $CO_3^{2-}$

$NH_4^+$ [illegible] $SiO_3^{2-}$

[illegible]:

$Al_2(SO_4)_3$ [illegible] $NaHCO_3$ [illegible]

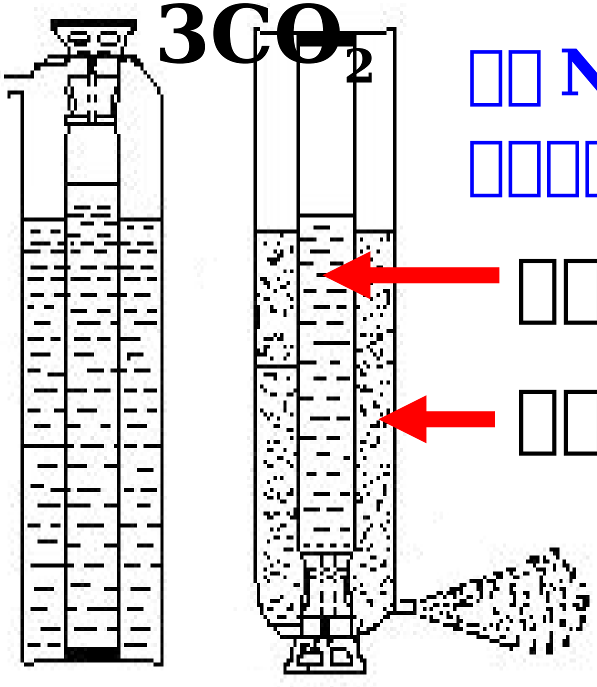
[illegible]

$Al^{3+} + 3H_2O \rightleftharpoons Al(OH)_3 + 3H^+$

$HCO_3^- + H_2O \rightleftharpoons H_2CO_3 + OH^-$

[illegible]

$Al^{3+} + 3HCO_3^- = Al(OH)_3\downarrow + 3CO_2\uparrow$



[illegible] $NaHCO_3$ [illegible] $Al_2(SO_4)_3$ [illegible]

[illegible]

[illegible] $Al_2(SO_4)_3$ [illegible]

[illegible] $NaHCO_3$ [illegible]

□□ 1. □□□□ 0.1mol/L □□□□□□ ① $NaHCO_3$

② $Na_2CO_3$ ③ $NaCl$ ④ $NaHSO_4$ ⑤ $NH_4Cl$, □

④⑤③①②

pH □□□□□□□□ ________________ □

2. □□□□□□ 0.1mol/L □

$NH_4Cl$ □ $NH_4HSO_4$ □ $CH_3COONH_4$

□□□ $C(NH_4^+)$ □□□□□□:

$NH_4HSO_4 > NH_4Cl >$

$CH_3COONH_4$

3. 0.1mol/L □ $NH_4Cl$ □□□□□□□□□□□□□□□:

$c(Cl^-) > c(NH_4^+) > c(H^+)$

$> c(OH^-)$

________________________________________

## 5. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] HF [illegible] $CH_3COOH$ [illegible] HClO [illegible]

$6.3\times10^{-4}$ [illegible] $1.75\times10^{-5}$ [illegible] $4.0\times10^{-8}$

(1) [illegible]

(2) [illegible] $F^-$ [illegible] $CH_3COO^-$ [illegible] $ClO^-$ [illegible] $H^+$ [illegible]

[illegible]

(3) [illegible] KF [illegible] $CH_3COONa$ [illegible] NaClO [illegible]

[illegible]

[illegible] P50 [illegible]

4 [illegible] NaX [illegible] NaY [illegible] NaZ [illegible]
pH [illegible] 8 [illegible] 9 [illegible] 10 [illegible]      [illegible]

A [illegible]　D $Z^-$+H2O$\rightleftharpoons$HZ+$OH^-$

B [illegible]　HY$\rightleftharpoons H^+ + Y^-$

C [illegible]　[illegible] HX [illegible] HY [illegible] HZ

D [illegible]　$Z^-$+HX$\rightleftharpoons$HZ+$X^-$

[illegible]

[illegible]

[illegible]

**1** [illegible] [illegible] [illegible]

① [illegible]

[illegible] ( [illegible] ) **$NaClO$ (aq) > $NaHCO_3$ (aq)**

[illegible] **$HClO$ < $H_2CO_3$**

② [illegible]

[illegible] ( [illegible] ) **$MgCl_2$ (aq) < $AlCl_3$ (aq)**

[illegible] **$Mg(OH)_2$ > $Al(OH)_3$**

## 2 [illegible]

① [illegible] [illegible]

② [illegible] [illegible]

③ [illegible] [illegible]______ [illegible]

[illegible]______ [illegible]

[illegible] [illegible]______ [illegible]

[illegible]______ [illegible]

[illegible] $FeCl_3$ [illegible]

$Fe^{3+} + 3H_2O \rightleftharpoons Fe(OH)_3 + 3H^+$

[illegible]____HCl____[illegible] $FeCl_3$ [illegible]

[illegible] $Fe^{3+} + 3H_2O \rightleftharpoons Fe(OH)_3 + 3H^+$

| [illegible] | [illegible] | [illegible] | $n(H^+)$ | $c(H^+)$ | pH |
|---|---|---|---|---|---|
| [illegible] | → | ↑ | ↑ | ↑ | ↓ |
| [illegible] HCl(g) | ← | ↓ | ↑ | ↑ | ↓ |
| [illegible] $H_2O$ | → | ↑ | ↑ | ↓ | ↑ |
| [illegible] Mg [illegible] | → | ↑ | ↓ | ↓ | ↑ |
| [illegible] $NaHCO_3$ | → | ↑ | ↓ | ↓ | ↑ |
| [illegible] NaF | → | ↑ | ↓ | ↓ | ↑ |
| [illegible] NaOH | → | ↑ | ↓ | ↓ | ↑ |

[illegible]

1. $Ca(OH)_2$ [illegible] $HClO$ [illegible]

2. [illegible]

3. [illegible]

4. [illegible] $NaHCO_3$($Na_2HPO_4$ [illegible] $NaHS$) [illegible] $NaHSO_3$ [illegible] $NaHC_2O_4$ [illegible] $NaH_2PO_4$ [illegible]

□□□□□□□□□□□□□□□□

□ $NaHCO_3$ ① $HCO_3^- + H_2O \rightleftharpoons H_2CO_3 + OH^-$

② $HCO_3^- \rightleftharpoons CO_3^{2-} + H^+$

□□□ ① □□ > ② □□ ∴ □□□___□___□

$NaHCO_3$ □ NaHS □ $Na_2HPO_4$ □□□□□□

□ $NaHSO_3$ ① $HSO_3^- + H_2O \rightleftharpoons H_2SO_3 + OH^-$

② $HSO_3^- \rightleftharpoons SO_3^{2-} + H^+$

□□□ ① □□ < ② □□ ∴ □□□___□___□

$NaHSO_3$ □ $NaH_2PO_4$ □□□□□□

□3□ $NaHSO_4$

□

□□□□□□□□:

$Al_2(SO_4)_3$ □ $NaHCO_3$ □□□

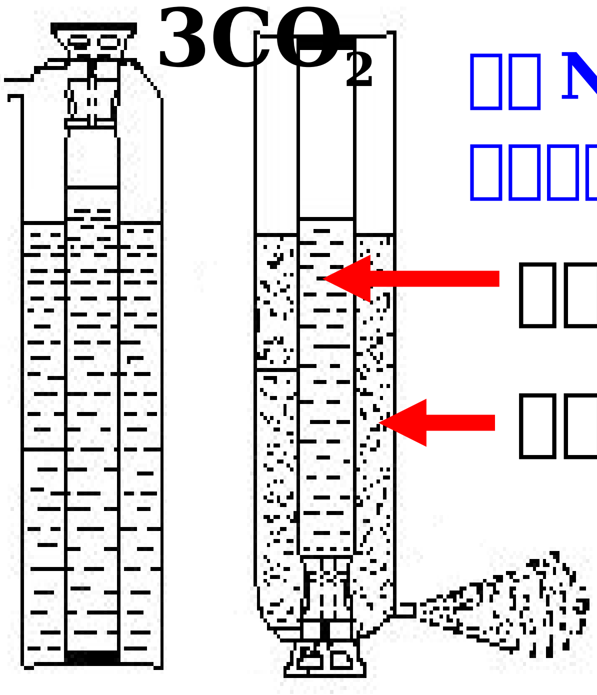
□□□

$$Al^{3+} + 3H_2O \rightleftharpoons Al(OH)_3 + 3H^+$$

$$HCO_3^- + H_2O \rightleftharpoons H_2CO_3 + OH^-$$

□□□

$$Al^{3+} + 3HCO_3^- = Al(OH)_3\downarrow + 3CO_2\uparrow$$



□□ $NaHCO_3$ □□□□□□□ $Al_2(SO_4)_3$ □□□ □□□□□□□□□□□□□□□□□

□□□□□□ $Al_2(SO_4)_3$ □□

□□□□ $NaHCO_3$ □□

## [illegible]

**1** [illegible] **Why** [illegible]

[illegible] $CO_3^{2-}$ [illegible]

**2** [illegible] $FeCl_3$ [illegible]

$$Al^{3+} + 3H_2O \rightleftharpoons Al(OH)_3 \text{ ([illegible]) } + 3H^+$$

$$Fe^{3+} + 3H_2O \rightleftharpoons Fe(OH)_3 \text{ ([illegible]) } + 3H^+$$

[illegible]

3 [illegible]

$(NH_4)_2SO_4$ [illegible] → [illegible]

$Ca(OH)_2$ [illegible] $K_2CO_3$ [illegible] → [illegible]

[illegible] [illegible]

4 [illegible]

$Al^{3+}$ [illegible] $AlO_2^-$: $Al^{3+} + 3AlO_2^- + 6H_2O = 4Al(OH)_3\downarrow$

$Al^{3+}$ [illegible] $HCO_3^-$: $Al^{3+} + 3HCO_3^- = Al(OH)_3\downarrow + 3CO_2\uparrow$

$Al^{3+}$ [illegible] $CO_3^{2-}$: $2Al^{3+} + 3CO_3^{2-} + 3H_2O = 2Al(OH)_3\downarrow + 3CO_2\uparrow$

$Al^{3+}$ [illegible] $S^{2-}$: $2Al^{3+} + 3S^{2-} + 6H_2O = 2Al(OH)_3\downarrow + 3H_2S\uparrow$

5、[illegible]

$$Fe^{3+} + 3H_2O \rightleftharpoons Fe(OH)_3 + 3H^+$$

[illegible] $FeCl_3$ [illegible]______[illegible]______[illegible]

[illegible] $FeCl_2$ [illegible]______[illegible] **Fe** [illegible]______[illegible]

[illegible] $FeSO_4$ [illegible]______[illegible] **Fe** [illegible]______[illegible]

**6** [illegible]

[illegible] $Na_2CO_3$ [illegible] NaF [illegible]

## 7 □ □□□□□□□□

$AlCl_3$ □□ —□□→ $Al(OH)_3$ —□□→ $Al_2O_3$

□□□□□□□□□□□□□□□□

① NaCl □□ NaCl

□□ 1. □□□□—□□□

② $CuSO_4$ □□ $CuSO_4$

□□ 2. □□□□□□□□□□□
□□□□ $Al_2(SO_4)_3$ □ $NaAlO_2$ □ $CH_3COONa$

③ $Na_2CO_3$ □□ $Na_2CO_3$

④ $FeCl_3$ □□ $Fe_2O_3$ ($Fe(OH)_3 \rightarrow Fe_2O_3$)

□□ 3. □□□□□□□□□□□□ $FeCl_3$ □ $FeCl_2$ □ $CuCl_2$ □ $AlCl_3$ □ $NH_4Cl$ □

⑤ **$NaHCO_3$** □□ **$Na_2CO_3$**

□□ **4.** □□□□□□□□

**$Ca(HCO_3)_2$** □□ **$CaCO_3$(□ $CaO$ □ $CO_2$)**

⑥**$Na_2SO_3$** □□ **$Na_2SO_4$**

□□ **5.** □□□□□□□□□ **$O_2$** □□

8□$P_{58}$ □□□□□□□□□□□□□□

□□□1. □□□□□□□□□□□□□

① $CH_3COONa$　　② $FeCl_2$　　③$Al_2(SO_4)_3$

④$CH_3COONH_4$　　⑤ $AlCl_3$

2. □□□□□□□□

①$NH_4Cl$□　② $(NH_4)_2SO_4$□　③ $(NH_4)_2CO_3$□

④$NH_4HCO_3$□⑤ $NH_4HSO_3$□　⑥ $CH_3COONH_4$

⑦$(NH_4)_2Fe(SO_4)_2$

□ $c(NH_4^+)$ □□□□□□□□□□ ____⑦②③⑤①⑥④____

3□□□□□□□□□□□

□1□□□□□□□□□□□□□□□□□□□□

□2□□ MgO □□ $MgCl_2$ □□□□ $Fe^{3+}$

□3□□ $MgCl_2 \cdot H_2O$ □□□□□□□ HCl □□□□□

# □□□□□□□□□□□□□

## 1 □□□□□

① □□□□□□□□□□

□□ $NH_3 \cdot H_2O$ □□□□

$c(NH_3 \cdot H_2O) > c(OH^-) > c(NH_4^+) > c(H^+)$

② □□□□□□□□□□□□□□□□□□

□□ $H_2S$ □□□□

$c(H_2S) > c(H^+) > c(HS^-) > c(S^{2-})$

## 2 [illegible]

① “[illegible]”[illegible]

[illegible] $KAl(SO_4)_2$ [illegible] $c(K^+)$ > $c(Al^{3+})$

② [illegible]

[illegible] $NH_4Cl$ [illegible]

$c(Cl^-)$ > $c(NH_4^+)$ > $c(H^+)$ > $c(OH^-)$

③ [illegible]

[illegible] $Na_2CO_3$ [illegible]

$c(Na^-)$ > $c(CO_3^{2-})$ > $c(OH^-)$ > $c(HCO_3^-)$ > $c(H^+)$

**3** [illegible]

[illegible] **1** [illegible]

[illegible]

[illegible] $CH_3COONa$ [illegible] $NH_4Cl$

[illegible] $Na_2SO_3$ [illegible] $(NH_4)_2SO_4$ [illegible] $NaHSO_3$ [illegible] $NaHCO_3$

[illegible]

[illegible]

[illegible].[illegible]

[illegible] c $(H^+)$ [illegible] c $(OH^-)$ [illegible]

[illegible]. $C(H^+)$ [illegible] $=C(OH^-)$ [illegible]

[illegible]2[illegible]

① $H_2CO_3$ [illegible] $H_3PO_4$

② $CH_3COONa$ [illegible] $NH_4Cl$ [illegible] $Na_2CO_3$

③ $NaHCO_3$ [illegible] $Na_2HPO_4$ [illegible] NaHS [illegible]

$NaHSO_3$ [illegible] $NaHC_2O_4$ [illegible] $NaH_2PO_4$ [illegible]

④ $CH_3COONa$ [illegible] $CH_3COOH$ 1:1 [illegible]

$NH_4Cl$ [illegible] $NH_3·H_2O$ 1:1 [illegible]

[illegible]

NaA [illegible] HA 1:1 [illegible]

0.02mol/L $CH_3COOH$ [illegible] 0.01mol/L NaOH [illegible]

0.01mol/L 20mL NaOH [illegible] 0.01mol/L $CH_3COOH$ [illegible]

□□□□ 0.1mol/L □ $CH_3COONa$ □□ 20mL □ 0.1mol/L □ HCl □□ 10mL □□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□ □□□□□□□BD

A □ ($CH_3COO$□)> *c*(Cl□)> *c* (H□)> *c* ($CH_3COOH$)

B □ *c* ($CH_3COO$□)> *c* (Cl□)> *c* ($CH_3COOH$)> *c* (H□)

C □ *c* ($CH_3COO$□)= *c* (Cl□)> *c* (H□)> *c* ($CH_3COOH$)

D □ *c* ($Na^+$)+ *c* (H□)= *c* ($CH_3COO$□)+ *c* (Cl□) + *c* (OH□)

□□□1□□□□□□□□□□□□□□□□□□□□□（　　　　□

A□pH=2□HA□□□pH=12□MOH□□□□□□□□ AC

$c(H^+) + c(M^+) == c(OH^-) + c(A^-)$

B□pH□□□$CH_3COONa$□NaOH□$Na_2CO_3$□□□□□

$c(NaOH)$□$c(CH_3COONa)$□$c(Na_2CO_3)$

C□□□□□□□□□$CH_3COOH$□$CH_3COONa$□□□

□□□□□

$$c(CH_3COO^-) + 2c(OH^-) == 2c(H^+) + c(CH_3COOH)$$

D□0.1mol·L$^{-1}$□NaHA□□□□pH=4□

$c(HA^-)$□$c(H^+)$□$c(H_2A)$□$c(A^{2-})$

2、下列关于相同温度下物质的量浓度相同的 NaCl 溶液和 NaClO 溶液的叙述中正确的是　(　A　)

A. NaCl 溶液中的 $c(Cl^-)$ 等于 NaClO 溶液中的 $c(ClO^-)$ 与 $c(HClO)$ 之和

B. NaCl 溶液中离子的总浓度小于 NaClO 溶液中离子的总浓度

C. 两溶液中的 $c(H^+)$ 与 $c(OH^-)$ 之和相等

D. NaCl 溶液的 pH 大于 NaClO 溶液的 pH

3□□09□□□□□□I·10□□0.1mol·L□1□□□□□0.1mol·L□1□□□□□□□□□□□□□□□□□□□□(　　　　)

C

A□*c*($NH_4$□)□*c*(Cl□)□*c*(OH□)□*c*(H□)

B□*c*($NH_4$□)□*c*(Cl□)□*c*(OH□)=*c*(H□)

C□*c*(Cl□)□*c*($NH_4$□)□*c*(OH□)□*c*(H□)

D□*c*(Cl□)□*c*($NH_4$□)□*c*(H□)□*c*(OH□)

4 □ □ 50mL0.1mol/L □ $Al_2(SO_4)_3$ □ □ 100mL 0.4mol/LKOH □□□□□□□□□□□□□□□□□□□□□□□ □

C

A□ $c(K^{□}) > c(AlO_2^{□}) > c(SO_4^{2□}) > c(OH^{□}) > c(H^{□})$

B□ $c(SO_4^{2□}) > c(K^{□}) > c(AlO_2^{□}) > c(OH^{□}) > c(H^{□})$

C□ $c(K^{□}) > c(SO_4^{2□}) > c(AlO_2^{□}) > c(OH^{□}) > c(H^{□})$

D□ $c(K^{□}) > c(SO_4^{2□}) > c(AlO_2^{□}) > c(H^{□}) > c(OH^{□})$

5□□07□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□10 mL 0.01 $mol \cdot L^{-1}$ $NaHC_2O_4$□□□□□0.01 $mol \cdot L^{-1}$ NaOH□□□□□NaOH□□□□□□□□□□□□□□□□□□□□□□(　　)

D

A□$V(NaOH) = 0$□□$c(H^+) = 1\times10^{-2}$ $mol \cdot L^{-1}$

B□$V(NaOH)$□10 mL□□□□□□□$c(Na^+) =$ $2c(C_2O_4^{2-})$□$c(HC_2O_4^-)$

C□$V(NaOH) = 10$ mL□□$c(H^+) = 1\times10^{-7}$ $mol \cdot L^{-1}$

D□$V(NaOH)$□10 mL□□$c(Na^+)$□$c(C_2O_4^{2-})$□$c(HC_2O_4^-)$

6 □ □ 09 □ □ □ □ □ □ □ □ □ □ $V_a$ □ 0.05mol·$L^{-1}$ $CH_3COOH$ □□□□□□□□□ $V_b$ □ 0.05mol·$L^{-1}$KOH □ □□□□□□□□□□( )

C

A □ $V_a$ □ $V_b$ □□ $c(CH_3COOH)+c(CH_3COO^-)$ □ $c(K^+)$

B □ $V_a=V_b$ □□ $c(CH_3COOH)+ c(H^+)=c(OH^-)$

C □ $V_a<V_b$ □□ $c(CH_3COO^-)$ □ $c(K^+)$ □ $c(OH^-)$ □ $c(H^+)$

D □ $V_a$ □ $V_b$ □□□□□ $c(K^+)+ c(H^+)= c(OH^-)+ c(CH_3COO^-)$